

A Review of NIOSH Research Activities in the Oil and Gas Extraction Industry

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The findings and conclusions in this report are those of the author(s) and do not necessarily represent the views of the National Institute for Occupational Safety and Health.

National Institute for Occupational Safety & Health (NIOSH)

- Part of the Centers for Disease Control & Prevention (CDC)
- Research-focused
- Generate new knowledge
- Work with partners – research 2 practice



Session Overview

1. Industry overview
2. Data-driven research
3. Partnerships
4. WV activities



Oil on canvas, by Joe Burns.



Recent Industry Growth

The oil and gas **workforce doubled** and the number of **drilling rigs increased 71%** from 2003-2013.

Well Servicing Companies



Oil and Gas Operators



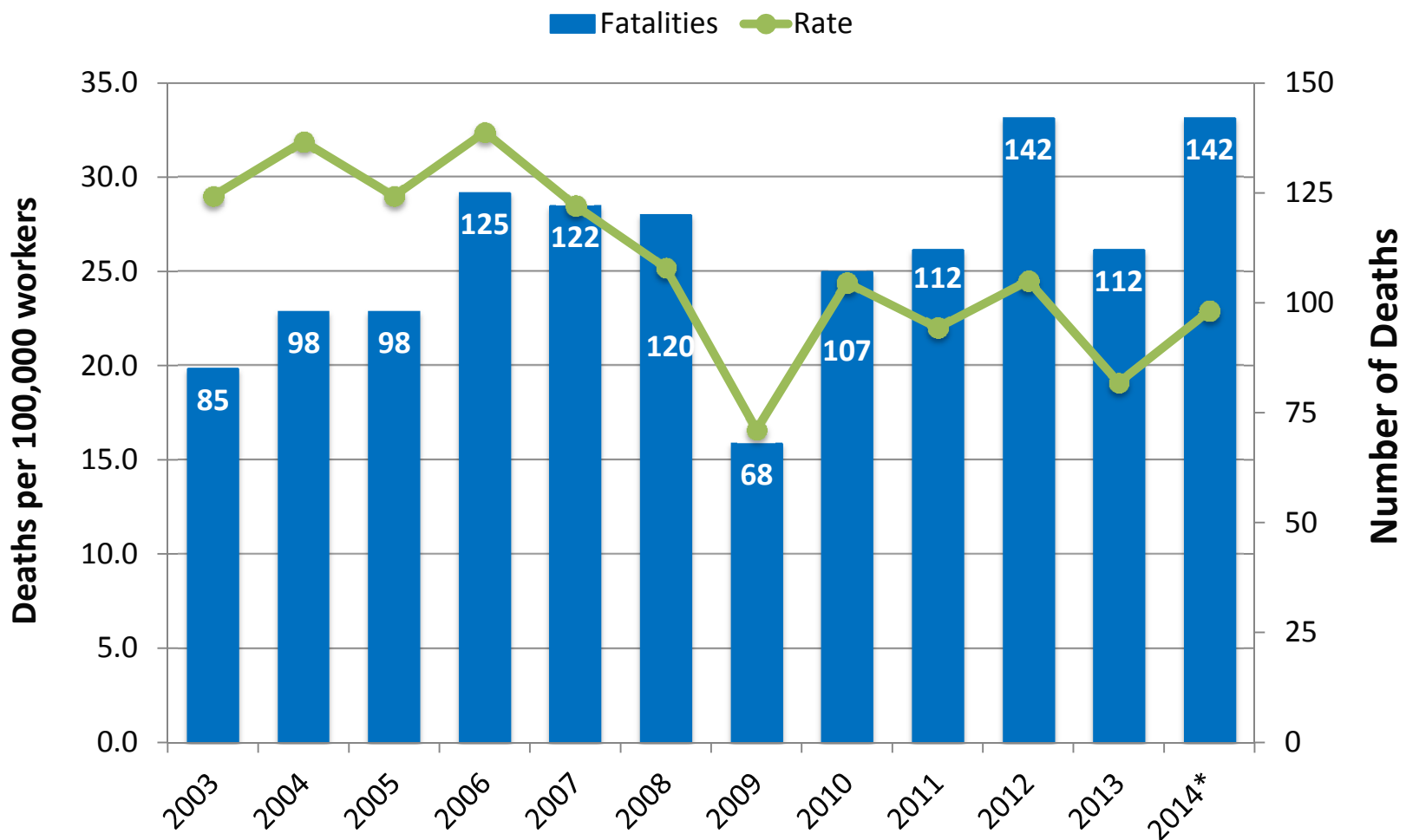
Drilling Contractors



Note: Worker Estimates from BLS Quarterly Census of Employment and Wages (2013).

Number and Rate of Fatal Work Injuries

U.S. Oil & Gas Extraction Industry, 2003-2014

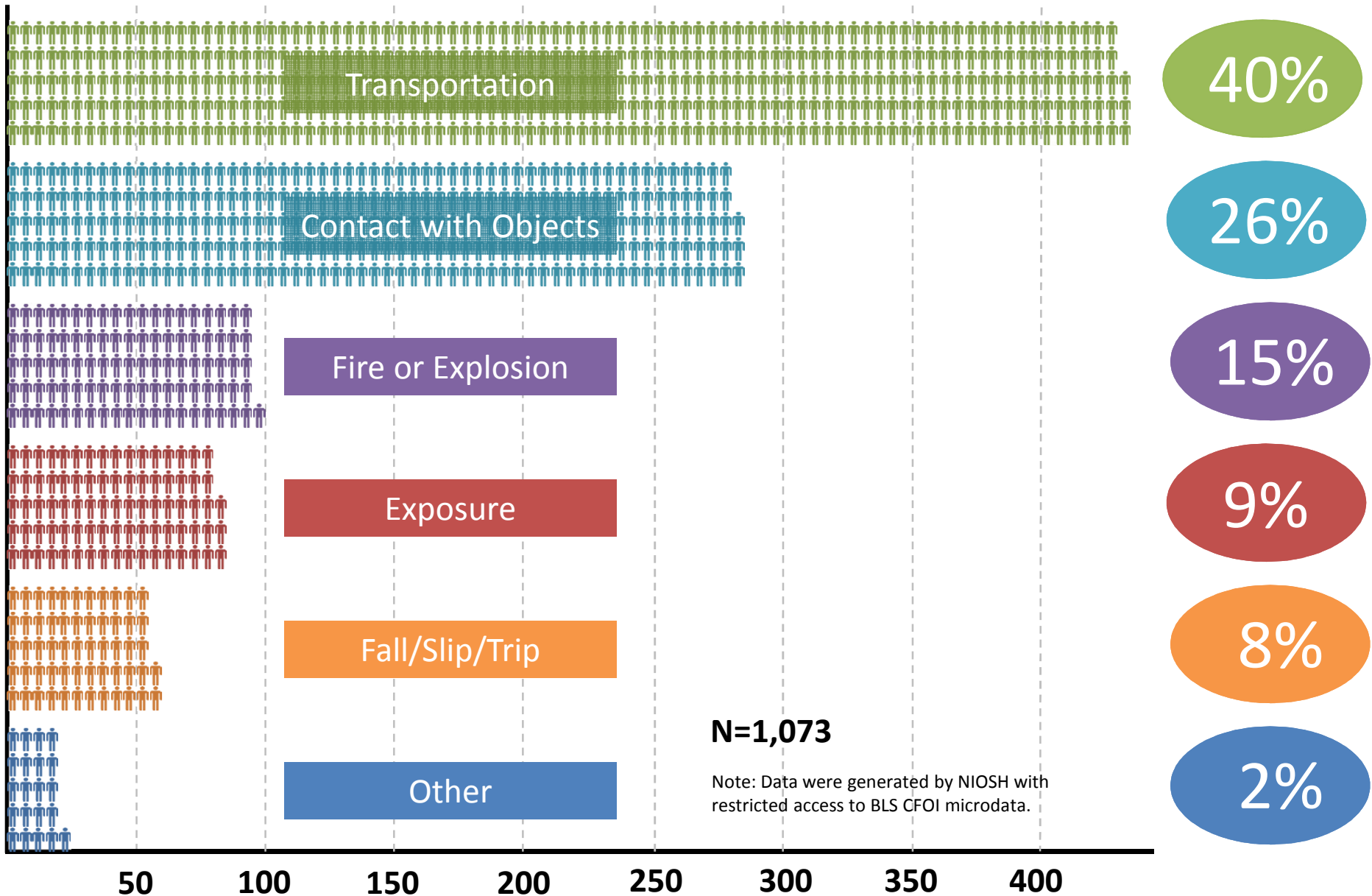


Note: Fatality counts from BLS Census of Fatal Occupational Injuries. Worker Estimates from BLS Quarterly Census of Employment and Wages (2014). Rate per 100,000 workers per year. Includes NAICS 211, 213111, 213112. *Data for 2014 are preliminary.

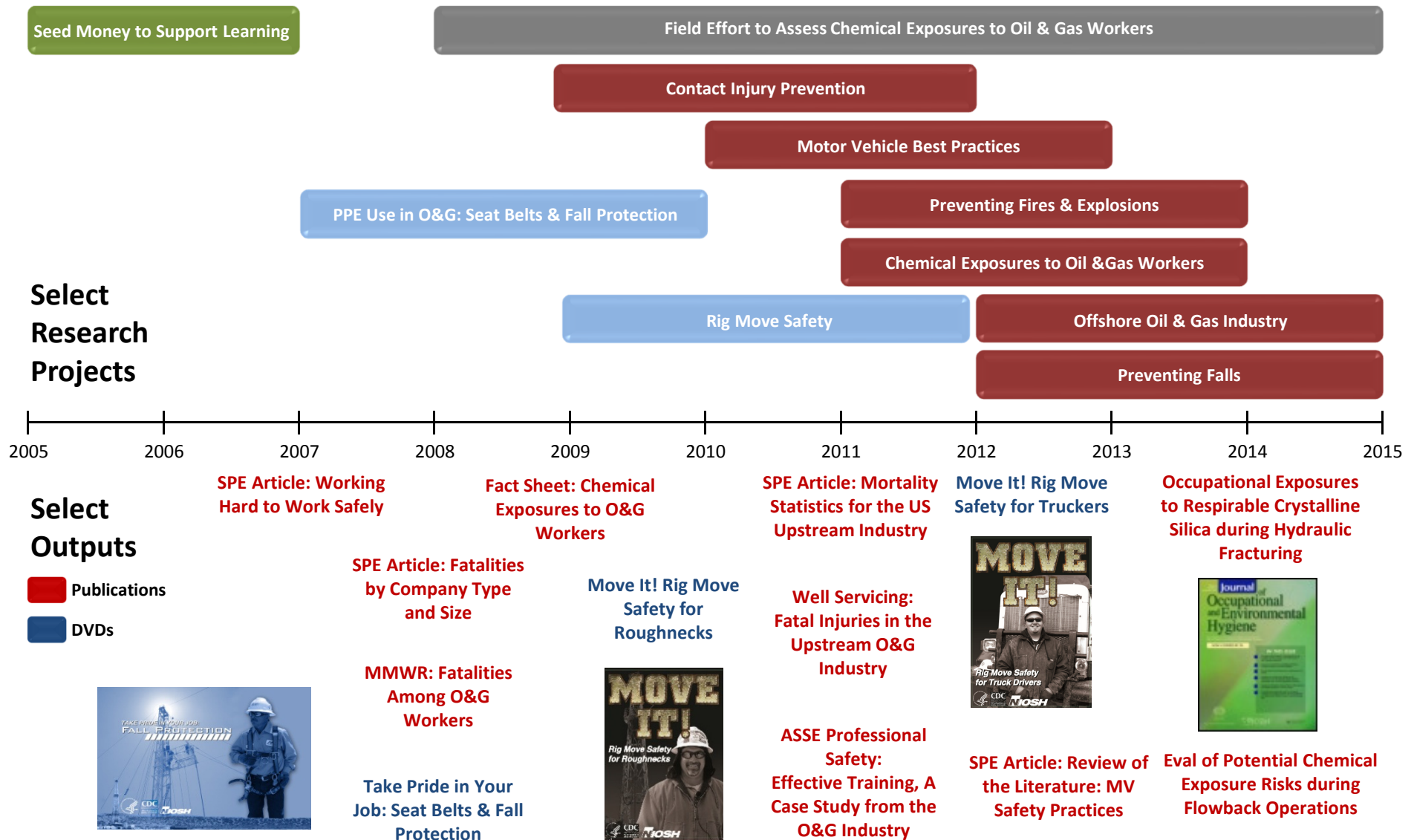
N=1,331

Most Frequent Fatal Events

U.S. Oil & Gas Extraction Industry, 2003-2012

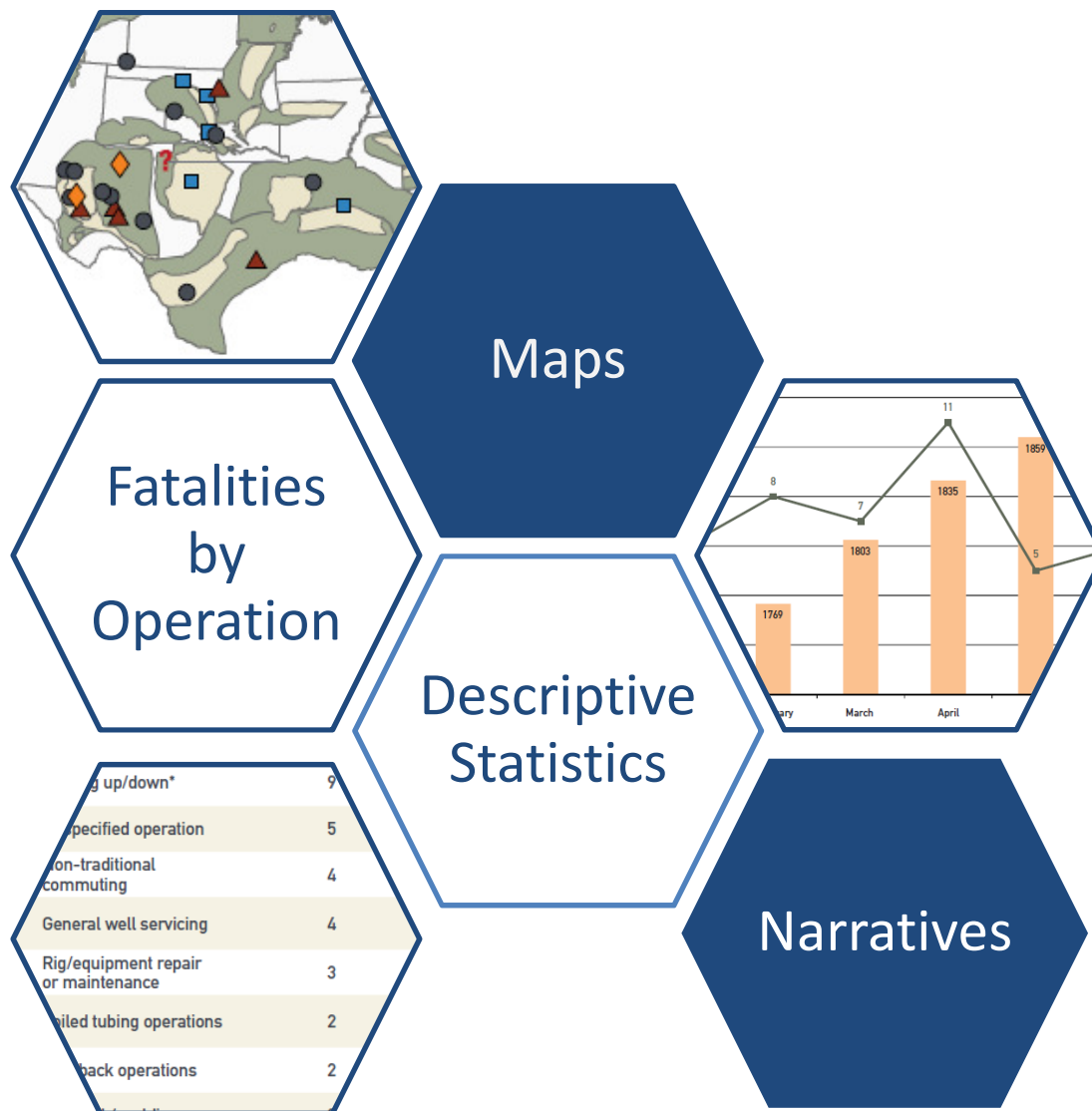
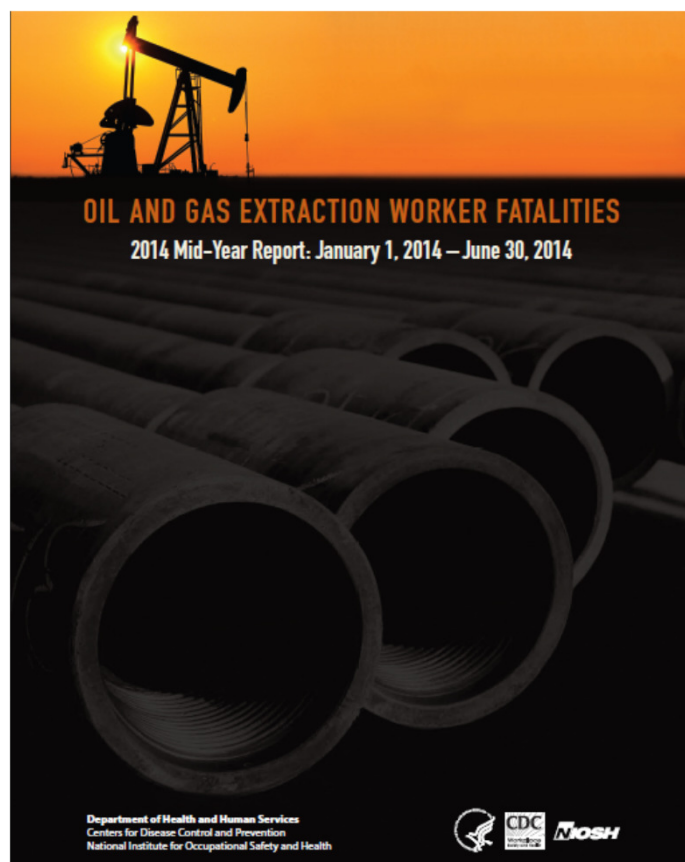


Select NIOSH Research Projects & Publications



First NIOSH Publication

2014 Mid-Year Fatality Report



www.cdc.gov/niosh/docs/2015-239/pdfs/2015-239.pdf

Partnership Program: NORA Oil & Gas Council



NIOSH Respirable Crystalline Silica (RCS) Field Study, 2010-2011

- 11 sites, 5 states
- Winter, spring, summer
- Various elevations
- More than half exceeded OSHA limit



Point Sources of Respirable Crystalline Silica Release



1.



2.



3.



4.



5.



6.



7.



8.



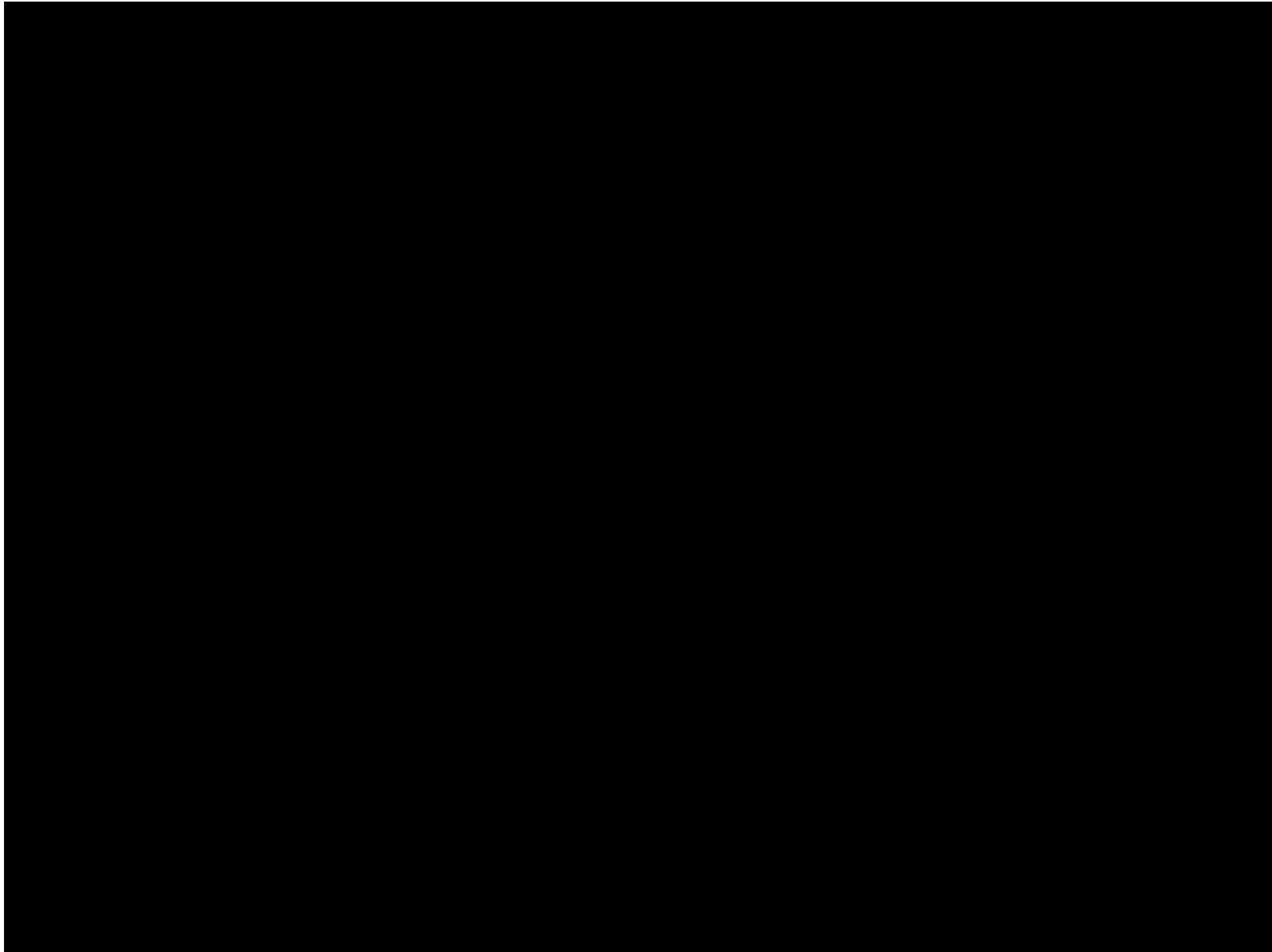
Fatalities Associated with Manual Gauging, Thieving, Fluid Handling

Nine (9) worker deaths where inhalation of petroleum hydrocarbons was likely factor.

- All occurred at production tanks.
- All employees were working alone or not being observed.
- 5 fatalities occurred during thieving (collecting a sample) by fluid haulers.
- 4 fatalities occurred while manual tank gauging.



FLIR Video



NIOSH FOG Report and Science Blog

Suspected Inhalation Fatalities Involving Workers during Manual Tank Gauging, Sampling, and Fluid Transfer Operations

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FATALITIES IN THE OIL AND GAS EXTRACTION INDUSTRY (FOG)

Overview

The NIOSH Fatalities in Oil and Gas Extraction (FOG) is a national database that collects detailed information about fatal events in the U.S. oil and gas extraction industry. FOG protects workers by monitoring trends, identifying emerging issues, and producing timely reports summarizing fatal events in the industry. FOG data are used to inform NIOSH, industry, and other stakeholder groups, and guide interventions that will prevent future loss of life in this industry. More information can be found at About FOG.

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New Hours of Operation

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Closed Holidays

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www.cdc.gov/niosh/topics/fog/publications.html



Hazard Alert

TANK HAZARD ALERT

gauging • thieving • fluid handling
how to recognize and avoid hazards



Opening thief hatches of storage tanks can lead to the rapid release of high concentrations of hydrocarbon gases and vapors. Those may result in very low oxygen levels and toxic and flammable conditions around and over the hatch. Recent reports have documented fires or explosions, and described workers experiencing dizziness, fainting, headache, nausea, and, in some cases, death while gauging tanks, collecting samples, or transferring fluids. Tank gauging, thieving, and fluid handling can be performed safely with proper precautions.

hazards
that workers can encounter

- oxygen deficiency
- fires & explosions
- chemical toxicity
volatile organic hydrocarbons (VOCs)
propane
butane
benzene
hydrogen sulfide

potential effects of exposure

- death
- chronic illness
- flash fire burns
- dizziness
- irregular heartbeat
- irregular breathing
- respiratory irritation
- fatigue
- nausea
- eye irritation
- headache

PROTECT YOURSELF

Follow your employer's Hazard Assessment and Established Work Practices/Procedures

- Use toxic- or multi-gas meter as indicated
- Heed all alarms
- Stop flow into tanks prior to gauging, **when possible**
- Do not lean over open hatches – stand away/upwind/crosswind when possible
- Inversion/high humidity/lack of wind could increase danger
- Follow your employer's "lone worker" policy
- Allow tanks to ventilate after opening thief hatches
- Evacuate unsafe work areas and report immediately
- Know the limits of your respiratory protection

Wear proper PPE

Attend Hazard Communication Training

Be Aware of Potential Ignition Sources:

- Static
- Cell phones
- Open flames
- Sparks from tools or metal objects
- Ensure proper grounding/bonding

PPE
protect your

EMPLOYERS SHOULD

Conduct Exposure and Hazard Assessments at Worksites to determine needs for:

- Respiratory Protection
- PPE
- Monitoring Device such as:
 - Multi-gas meter
 - Other toxic gas meter

Implement Engineering Controls such as:

- Remote Gauging
- Closed Loop Systems
- Auto Gauging
- Sight Glasses/Gauges
- Remote venting

Provide Training to Employees:

- Hazard Communication
- Lone Worker Policy
- SOP for Tank Gauging
- Proper use of PPE and respiratory protection
- Emergency Response Plan
 - Procedures for alarm response and site re-entry
- Toxic gas or multi-gas meter(s) for O₂, H₂S, LEL, and CO

Verify that sub-contractors are following the SOP

Through the OSHA National Steps Alliance, this Tank Gauging Hazard Alert is for informational purposes only. It does not necessarily reflect the official views of OSHA or the U.S. Department of Labor. March, 2015

Under the Occupational Safety and Health Act, employers are responsible for providing a safe and healthy workplace and workers have rights. OSHA can help answer questions or concerns from employers and workers. OSHA's On-site Consultation Program (www.osha.gov/consultation) offers free and confidential advice to small and medium-sized businesses, with priority given to high-hazard workplaces. For more information, contact your regional or area OSHA office (www.osha.gov/html/RAmap.html), call 1-800-321-OSHA (6742), or visit www.osha.gov.



**YOUR
LIFE**

can change
in a

**SINGLE
BREATH**

or with

**ONE
SPARK.**

NIOSH Oil and Gas Research Activities, WV

2015 Exposure Assessment Field Research



NIOSH Oil and Gas Research Activities, WV

2015 Exposure Assessment Field Research

- July 2015: Jane Lew, Hancock, Brooke, and Ohio Counties
- Production operations legacy oil wells with seven “Lease Operators”
- Turn-in wet gas well
- NIOSH sampled:
 - Alcohols (propargyl and methanol)
 - Glutaraldehyde
 - Low molecular weight hydrocarbons
 - Noise
- Methods: personal and area samples, direct reading instruments, biological monitoring



NIOSH Oil and Gas Research Activities, WV

- Ongoing field studies
- Partnerships
 - Appalachian STEPS Network
 - Appalachian Shale Transportation Safety Network
- NIOSH FACE Program
 - Investigation of a July 2013 fatality to oilfield worker in WV



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